경영학 석사학위논문

Calendar Anomalies on Ramadan Season and Religion Holidays in Muslim Country. Evidence Indonesia.

무슬림 국가의 라마단 시즌과 종교 휴일의 일정 이상. 인도네시아 증거로.

2017 년 7 월

서울대학교 대학원

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Abstract

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The existence of seasonality in stock market returns has led researchers to study about specific calendar anomaly such as Ramadan season in Islam country. Ramadan is the holy month for Islam religion when Muslim (Islam people) fast for 30 days as spiritual training and discipline. Even though Indonesia is the biggest Islam country by population, Ramadan is only one of many big religion events where moving calendar anomalies might also exist on those events. This study examines whether the moving calendar anomalies exist not only on Ramadan season but also other religion holidays which affect stocks market return and volatility. The result shows that most of religion holidays have positive significant change in mean return while Ramadan season's return is not significant. There are also changes of volatility on some religion events. Moreover, this study also examines whether foreign investor related factors affect the stock market return and volatility on religion holidays. The result finds that the transaction value of foreign investors negatively affects stock market returns and volatility, while foreign investors trading pattern positively affect stock market returns and volatility.

Keywords : Calendar Anomaly, Ramadan Effect
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1. Introduction

The finding of existence of calendar anomaly in stock market all over the world is very important and vital as they broke the efficient market hypothesis of Fama (1970) that stock market returns have some regular pattern which can be used for investors to invest on stock market. Many researchers documented the existence of calendar anomalies in stock market returns since many years ago. January (month of the year), day of the week, and turn of the month effects are the examples. January effect which found in some countries shows that January has the highest return among other months of the year (Rozeff and Kinney, 1976). Many papers try to explain the cause of January effect such as the undefined small-firm risk factors and tax-loss selling hypothesis which assumes that in order to have less taxes at the end of the year, investors usually sell their securities and invest again at the beginning of the year which is month of January. On the other hand, the day of the week effect shows that Monday has significantly less average return among the days in a week. (Cross, 1973; French, 1980; Gibbsons and Hess, 1981). The explanation form researchers are the information release hypothesis where the negative information is usually delayed to be released at the end of the week, the information processing hypothesis which talks about the information asymmetry cost depend on the size firm, and the settlement regime hypothesis which concern about the correlation of settlement and transaction timing.

The wide range of calendar anomalies motivates researchers to explore more of possibilities to cause the seasonality in stock market returns. Ramadan effect is one of calendar anomalies which exist but does not get many attention since the anomaly has the uniqueness to only exist in Islam country. Ramadan effect is called moving calendar anomaly as Ramadan event follows the Islamic lunar calendar which comes about 10 days earlier every year which is not alike January effect and day of the week effect which follow fixed calendar events.

Ramadan is the ninth month of Islamic calendar, period of 30 days (one month) for Muslims (people who has Islam religion) to fast and pray as a part of their tradition in training their spiritual behavior and discipline. During the Ramadan, adult Muslims do not eat and drink for the whole day starting from dawn before the sun rises, until the time when sun sets down. Fasting is a must for adult Muslims as one of the five pillars of Islam while they are encouraged to devote themselves in doing spiritual activities such as praying more, reading holy Qur'an (Muslim holy book), praying together every night in the mosque after they break fasting ("Tarawih"), doing charity and acting piety. As Qur'an states in Surah al-Qadr:3 that Ramadan is "better than a thousand months", when Muslims can do fasting and spiritual activities well during Ramadan, they believe that Muslims will get much more blessings as Ramadan is the month of full blessings. Moreover, they also emphasize not to participate in prohibited "haram" activities which bring Muslims to sins.

The holy month Ramadan off course affect the economy activities in general, especially in Muslim country such as Indonesia which most population are conducting Ramadan activity. Many sectors and industry reduce their working hours during Ramadan as people tend to less energized because they do not eat and drink for the whole day. This cause a slowdown tendency in economic activities. On the other hand, there is a tradition for Muslims to celebrate the Eid Day (the celebration day which comes after the Ramadan end) by buying new clothes and preparing foods as they will gather with big families to enjoy the celebration. Moreover, there is culture to break the fast by eating dinner with some specific kind of dishes. This cause the grocery sales goes up significantly during Ramadan as people buy and shop more. In addition, Muslims stay awake longer at night either to prepare food for the earlier breakfast at dawn time before they start fasting or to pray which lead to more electricity consumption during Ramadan season.

Trading behavior is also influenced by Ramadan season as many Muslims categorize trading activities as a form of gambling activity, which is "haram" or prohibited by Islam values. Similarly, Islam also prohibit the use of interest "Riba"

Table 1. Indonesia's Religion Event List

Religion	Event	Description
Muslim	Ramadan* (30 days)	Period of Muslims fast, based on Islamic calendar, comes 10 days earlier every year
	Eid (2 days)	The big celebration day which comes after finishing of 30 days of Ramadan, based on Islamic calendar, comes 10 days earlier every year
	Adha (1 day)	Day to sacrifice, based on Islamic calendar
	Isra Miraj (1 day)	The new year of Islamic year
	Maulid Nabi (1 day)	Celebrating the birth date of Muhammad Prophet
	Muharram (1 day)	Celebrating the ascension of Muhammad Prophet
Christian	Easter (3 day)	Celebrating the rise of Jesus Christ from the death, usually April or May, based on solar and lunar calendar
	Ascension of Christ (1 day)	Celebrating the ascension of Jesus Christ, 40 days after Easter day, usually May or June, based on solar and lunar calendar
	Christmas (1 day)	Fixed day, Dec 25th
Hinduism	Silence Day (1 day)	The new year of Saka calendar (Hinduism calendar)
Budhism	Vhesak Day (1 day)	Celebrating the birth date of Budha, based on lunar calendar
Other Holidays (Non Religion Holidays) : New Year (1 day), Chinese New Year (1 day), Labour Day (1 day)		

*Ramadan season is not holiday

in doing business. As a result interest based securities trading is most likely to decline during Ramadan as people tend to trade more.

Indonesia is the biggest Muslim country in the world by the population as about 88% or about 200 million people are Muslims so that Indonesian have a huge participation in Ramadan event. However, Indonesia also celebrate other religion big days such Easter Day for Christian, Silence Day for Hinduism and Vhesak Day for Buddhism as Indonesia admits five official religions in which all people has to choose one among those religion to believe.

Table 1 shows the list of religion events which become national holiday that all Indonesian people celebrate every year. As the biggest religion in Indonesia with more than 200 million Muslims, Islam has the most religion events to be celebrated as the national holidays such as Eid Day, Adha Day, Isra Miraj Day, Maulid Nabi Day and Muharram Day. Ramadan is also national event which celebrated by Indonesian citizen in every area even though it is not holiday. Christian as the second biggest religion has three big religion events such as Easter Day, Ascension of Christ Day and Christmas Day. Catholic religion also celebrate the same day as Christian religion. Even though there is only little population of Indonesia citizen who take Hinduism and Buddhism as a religion, their big religion holidays are also national holidays every year. Hinduism celebrate Silence Day, when people do not work at all, do not turn on electricity and do meditation as the all the flight schedule are also rearranged into other days to avoid the noise. Buddhism also celebrate Vhesak Day, the birthdate of Buddha.

This study wants to examine whether the same moving calendar anomalies such as Ramadan effect also exist on other religion holidays such as Adha Day, Eid Day, Isra Miraj Day (other Islam religion holidays), Christian Day, Easter Day, Ascension of Christ Day (Christian religion holidays), Silence Day (Hinduism religion holiday), and Vhesak Day (Buddhism religion holiday). The existence of the moving calendar anomalies can be measured through stock market returns on those specific days. This study will use GARCH model to capture the significance effect of moving calendar anomalies among religion holiday events by assuming that moving calendar

anomalies exist on the religion holiday in which the stock return has significant change in value.

Moreover, the moving calendar anomalies can be also measured by the volatility return of stock market. Even though the stock market returns might be not significant, but the volatility might be lower or higher due to the different of investors trading activities behavior during religion holidays in Indonesia.

The result from previous researches for these two questions are somewhat mixed. The earlier study by F.J. Seyyed et all (2005) documents no significant change in mean return during Ramadan, but significant declines in return volatility stock returns in Saudi Arabia while H. Al-Hajieh et al (2011) finds that Ramadan season has significant and positive calendar effects in most Islamic Middle Eastern markets. The different finding can be due to the specific firm and country stock market characteristic in which Indonesia can also be very different with previous finding since Indonesia is biggest Islam country by population but also the official home for other religions.

This study will use GARCH model to examine the significance of calendar anomalies effect in affecting volatility. GARCH model is the extended version of ARCH specification which is proven to be very successful in predicting conditional variances. Moreover, GARCH model is one of the best model to deal with heteroskedasticity type where the volatility is not constant over period of time. The formulation of GARCH asserts that the best predictor of the variance in the next period is a weighted average of the long-run average variance, the variance predicted for this period and the most recent squared residuals capturing any new information, with declining weights assigned to past squared residuals. GARCH model has been successfully used by many researchers such as Al-Rjoub (2004) and Alrabadi et al. (2012) which used the same model to examines the calendar anomalies day of the week by comparing days in one week (Monday, Tuesday, etc) to find out which day has the most and less significant returns. The same approach is applied to this study by comparing Ramadan and other religion holidays to see the significance on stock returns.

In general, Indonesia investors consist of domestic and foreign investors. Domestic investors are most likely Indonesia citizen who celebrate the religion holiday events, especially Ramadan season and other Islam religion holidays as the domestic investors are expected mostly Muslim in Indonesia. However, this study wants to examine whether foreign investors are also affected by the moving calendar events on religion holidays since foreign investors most likely do not celebrate or even do not know about the these religion events. Foreign investor trading activity in Indonesia stock market might be affected by the religion events indirectly but resulting significant effect on stock returns. In this study, foreign investor trading activity is measured by two factors, the ratio of value transaction made by foreign investors among total transaction value, and foreign investors trading pattern as net buyer (buy more than sell) or net seller (sell more than buy).

2. Literature Review

The holy month Ramadan provide a unique event to explore more about seasonality in stock return as a result of changed pattern of stock return and volatility during Ramadan compare to other months. Husain (1998) documents the Ramadan effect on stock return and volatility of Pakistani equity market. The result shows that there is no significant change in mean return during Ramadan, however there is significant declines in return volatility. Similarly, F.J. Seyyed et all (2005) examines the weekly stock returns and volatility of the overall Saudi stock market, as the largest equity market in term of market capitalization in the Middle East and among Muslim countries, and its six constituent sectors using the conditional variance GARCH model. The result documents that even though the average rate of returns during Ramadan are not significantly affected, there is a systematic pattern of decline in volatility. Moreover, the result also shows the decline in trading activity during Ramadan which is consistent with the decline of volatility.

On the other hand, H. Al-Hajieh et al (2011) finds strong evidence that Ramadan season has significant and positive calendar effects in most Islamic Middle Eastern

markets. The researchers refer the evidence to the concept of investor sentiment which is also positive as they argue that the cause can be possibly attributed to synchronization-related herding effects amplifying the impact of the mood swings during Ramadan. As investor sentiment play a large role in the movement of stock prices (Edmans et al., 2007), changes in the general mood of Muslims have a significant impact on stock market in Muslim countries explained as potential significant factor in financial trends (Elliot and Echols, 1976) which lead a relatively uniform set of stimuli that impact investors (mostly Muslim investors) to make decision in trading activity (Prechter, 1985, 1999). (Elliot and Echols, 1976)

Muslims try to improve themselves to become better person during Ramadan by fasting and doing spiritual activities, learn to be more patient, humble, discipline, generous, etc so that Muslims experience series of emotions. Researchers explain that Ramadan brings positive mood so there may be more tendency to invest. Even though they are hungry because of fasting which can give them bad mood and emotion, but according to Muslims' religious beliefs, Ramadan eventually gives them better feel to trade more during holy month. However, Ramadan is also a period of time with greater emotional uncertainty when Muslim investors have greater dependence on behavioral heuristics (optimism bias and outcome bias) and also being more emotionally sensitive to the impact of external influences so they make financial decisions based on emotions they have during that period. Ramadan bring positive emotion that make investors be less analytical and less discriminating in relation to their stock market investments.

H. Al-Hajieh et al (2011) also finds that market returns in the first and last days of Ramadan has high level of stock market volatility which is consistent with the concept of increased synchronization of opinions, interpreted that most investors think and behave in the same way. During Ramadan, as the social interaction increase, the importance of social networks increase and social effect on decision making become stronger which intensify herding effect resulting from the most people have very similar religious experience at the same time.

J. Bialkowski et al. (2012) observes stock returns during 129 months Ramadan for 14 predominantly Muslim countries from 1989-2007. The result finds that Ramadan has higher significant and less volatile stock returns. This paper explains that the result caused by investor psychology. Ramadan is very important period which affect most aspects of Muslims' life. During Ramadan, Muslims not only try to build closer relationship with God, but also closer relationship with fellow Muslims. Ramadan teaches about solidarity among Muslims, how they have to be grateful for life and lead to optimistic beliefs. This optimism affect investor sentiment and decisions in trading activities.

3. Overview of Indonesia Stock Market

Indonesia stock market already exist from 1912 when Indonesia was still colonialized by Dutch government, even before the Independence of Indonesia in 1945. After years, Indonesia stock market started to operate again in 1977 operated by Capital Market Supervisory Agency under Ministry of Finance and grew rapidly ever since, as government supported with incentives and regulations. Indonesia Stock Market had 462 listed companies with market capitalization $426.78 billion in 2012. In 2016, it was documented that Indonesia Stock Market had 519 listed companies, more than 500,000 domestic investors with total daily transactions more than 250,000 transactions/day which counted average value Rp. 6,400 billion/day. Moreover, Indonesia Stock Market set the second highest capital value in the Southeast Asia with $446.41 billion below Singapore with $476.91 billion.

4. Data

The data used in this study derived from Indonesia Stock Market (IDX) firm, consist of unbalanced daily stock data of 519 listed companies from January 1st, 2009 until December 31st, 2016. The data includes trade date, daily price (high, low, close), daily volume, daily value, foreign investors trading transactions data (foreign

daily buy and sell volume, buy and sell value) while specific firm characteristic data are excluded due to limitation of data.

Indonesia stock market has irregular trading pattern as trading activity for each firm is inconsistent (some companies have much more frequent trading activity than some other companies). In general, for some days, only some firms participate on one day trading activity while on other days many firms participate on one day trading activity. As a result number of observation for each single religion holidays are also different.

The cleaning data process is done in order to be able to capture the calendar anomalies effect on stock market returns and volatility from more balanced data. Even though Indonesia stock market (IDX) have 519 listed companies by 2016, only 268 companies are included in data. This study only include the firms which has quite stable trading activity since 1st January 2009 until 31th December 2016 in order to get more balanced data. Most of firms were established after year 2009 while some firms went bankrupt and got out from the stock market before 2016. In earlier year of 2009, Indonesia stock market was not well developed yet so there were not as many as trading transaction on that year compare to 2010 and following years. The firms which have trading transaction less day 10 days in one year are also excluded for the data.

Indonesia has many holidays compare to other countries which most of them are religion holidays (holidays which related to religion's event or activity). Table 2 shows a list of specific dates over year 2009 and 2016 for twelve religion events in Indonesia. The data is then used to plot the specific data for specific religion holidays as the variables.

In this study, return of stock market is defined as the difference change of stock price between 2 nearest period of time because there is no trading activity on the holidays. The formula is developed with the consideration to capture the calendar anomaly effect which exist on the religion holiday as the formula calculate the percentage change of stock market price before and after the event. Stock return is calculated with equation bellow.

Table 2. List of Religion Events in Indonesia from 2009 until 2016

	Islam						Christian			Hinduism	Buddhism
	Ramadan	**Eid**	**Adha**	**Muharram**	**Isra Miraj**	**Maulid Nabi**	**Easter**	**Ascension of Christ**	**Christmas**	**Silence Day**	**Vhesak Day**
2009	Aug 22 - Sep 20	Sep 21-22	Nov 27	Dec 18	Jul 20	Mar 9	Apr 10-12	May 21	Dec 25	Mar 26	May 9
2010	Aug 11 - Sep 9	Sep 10-11	Nov 7	Dec 7	Jul 10	Feb 26	Apr 2-4	May 13	Dec 25	Mar 16	May 28
2011	Aud 1 – Aug 30	Aug 31 – Sep 1	Nov 6	Nov 27	Jun 29	Feb 15	Apr 22-24	June 2	Dec 25	Mar 5	May 17
2012	July 20 - Aug 18	Aug 19-20	Oct 26	Nov 15	Jun 17	Feb 5	Apr 6-8	May 17	Dec 25	Mar 23	May 6
2013	July 8 – Aug 7	Aug 8-9	Oct 15	Nov 5	Jun 6	Jan 24	Mar 29-31	May 9	Dec 25	Mar 12	May 25
2014	June 27 - July 27	July 28-29	Oct 5	Oct 25	May 27	Jan 14	Mar 18-20	May 29	Dec 25	Mar 31	May 15
2015	June 17 - July 16	July 17-18	Sep 24	Oct 14	May 16	Dec 24	Apr 3-5	May 14	Dec 25	Mar 21	Jun 2
2016	June 6 – July 5	July 6-7	Sep 12	Oct 2	May 6	Dec 12	Mar 25-27	May 5	Dec 25	Mar 9	May 22

$$R_t = \frac{I_i - I_{i-1}}{I_{i-1}} \quad (1)$$

where R_t = return, I_i = price at period i, I_{i-1}= price at period i-1

Table 3. Descriptive Statistics of Indonesia Stock Market Daily Return (%) by Religion Events from January 1st, 2009 until December 31st, 2016

Description		Observation	Mean	Std. Dev.	Min	Max
	All Year	211890	0.0016	0.0405	-0.7515	0.8605
Islam	Ramadan	17289	0.0009	0.0392	-0.7515	0.6154
	Eid	859	0.0083	0.0427	-0.5344	0.2895
	Adha	852	-0.0053	0.0404	-0.2364	0.5273
	Isra Miraj	904	0.0014	0.0373	-0.2540	0.2388
	Maulid Nabi	832	0.0016	0.0347	-0.1978	0.3889
	Muharram	859	-0.0004	0.0317	-0.2073	0.1995
Christian	Easter	856	0.0085	0.0404	-0.2424	0.2439
	Ascension of Christ	761	-0.0004	0.0368	-0.2118	0.3878
	Christmas	818	0.0053	0.0396	-0.2917	0.4035
Hinduism	Silence Day	873	0.0075	0.0388	-0.2421	0.2982
Buddhism	Vhesak	910	0.0040	0.0474	-0.2913	0.7324
	Other Holiday	2481	-0.0030	0.0386	-0.2899	0.5522

*Ramadan is not holiday

Table 3 shows the descriptive statistics of stock returns during Ramadan season and religion holidays in Indonesia. In general, it can be seen that mean stock returns during the religion holidays are relatively higher than the average daily return for the whole year while Ramadan season mean is relatively smaller. The observation of each religion holidays are different because of the irregular pattern of trading activity in Indonesia stock market as not all firms always participate trading activity.

5. Result

5.1 Stock Return of Religion Holiday

The moving calendar anomaly effect of each religion event is examined through the regression model which includes twelve dummy variables representing the each religion events, four

Table 4. Estimation of Moving Calendar Anomaly Effect of Religion Events Holidays on Stock Return

The equation for regression is $R_{t,i} = \alpha_0 + \sum_{n=1}^{12} a_n holiday_{n_{t,i}} + \sum_{n=1}^{4} b_n day_{n_{t,i}} + \sum_{n=1}^{11} c_n month_{n_{t,i}} + \varepsilon_{t,i}$. $R_{t,i}$ is stock returns of firm i on time t, $holiday_n$ is dummy variable for twelve religion holidays. This equation use two control variables day_n and $month_n$. day_n is dummy variable for days in a week (Monday to Thursday) controlling the days of the week effect and $month_n$ is dummy variables for months in a year (January to November) controlling the monthly effect on stock returns. Panel (1) exclude control variables while Panel (2) include control variables.

		(1)	(2)
MAIN VARIABLE			
Relgion Holiday Effect			
Islam	Ramadan	-0.00070**	0.00018
		(0.00032)	(0.00037)
	Adha	-0.00699***	-0.00506***
		(0.00139)	(0.00140)
	Eid	0.00664***	0.00812***
		(0.00139)	(0.00140)
	Isra Miraj	-0.00028	0.00085
		(0.00135)	(0.00136)
	Maulid Nabi	-0.00004	-0.00034
		(0.00141)	(0.00141)
	Muharram	-0.00206	-0.00046
		(0.00139)	(0.00140)
Christian	Christmas	0.00368***	0.00533***
		(0.00142)	(0.00145)
	Easter	0.00681***	0.00704***
		(0.00139)	(0.00142)
	Ascension of Chirst	-0.00209	-0.00148
		(0.00147)	(0.00150)
Hinduism	Silence Day	0.00583***	0.00383***
		(0.00137)	(0.00140)
Buddhism	Vhesak	0.00238*	0.00323**
		(0.00135)	(0.00137)
	Non Religion Holidays	-0.00464***	-0.00253***
		(0.00082)	(0.00083)
	Constant	0.00164***	0.00094**
		(0.00009)	(0.00037)
	Observations	211,890	211,890
	R-squared	0.00067	0.00405

	(1)	(2)
CONTROL VARIABLES		
Day of the Week Effect		
Monday		0.00238
		(0.00028)
Tuesday		-0.00056**
		(0.00028)
Wednesday		0.00270***
		(0.00028)
Thursday		0.00089***
		(0.00028)
Monthly Effect		
January		0.00054***
		(0.00045)
February		0.00105**
		(0.00045)
March		0.00291***
		(0.00044)
April		0.00284***
		(0.00044)
May		0.00071
		(0.00045)
June		-0.00084*
		(0.00044)
July		0.00185***
		(0.00046)
August		-0.0027***
		(0.00046)
September		0.00035
		(0.00044)
October		0.00149***
		(0.00043)
November		-0.0020***
		(0.00044)

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

dummy variables to control the days of the effect, and eleven dummy variables to control the monthly effect on stock returns. The equation can be seen in equation (2) below.

$$R_{t,i} = \alpha_0 + \sum_{n=1}^{12} a_n holiday_{n_{t,i}} + \sum_{n=1}^{4} b_n day_{n_{t,i}} + \sum_{n=1}^{11} c_n month_{n_{t,i}} + \varepsilon_{t,i} \quad (2)$$

R_t is the daily return of firm I on day t. $holiday_n$ are dummy variables for the specific religion events, counted as value 1 if that day is religion holiday and value 0 otherwise, The twelve dummy variables are for Adha Day, Eid Day, Isra Miraj Day, Maulid Nabi Day, Muharram Day, Ramadan Season (Islam), Christian Day, Easter Day, Ascension of Christ Day (Christian), Silence Day (Hinduism) and Vhesak Day (Buddhism). day_n are four dummy variables as control variables to control the day of the week effect on Monday, Tuesday, Wednesday, and Thursday respectively. $month_n$ are eleven dummy variables to control the monthly effect on stock return on each month of a year starting from January until November.

Table 4 reports the estimation result of 12 religion events on stock returns in Indonesia stock market. The regression analysis over period 2009-2016 shows the existence of moving calendar effect on stock returns for some religion events such as Ramadan, Adha Day and Eid Day (Islam religion holidays), Christmas Day and Easter Day (Christian religion holidays), Silence Day (Hinduism religion holiday), Vhesak Day (Buddhism religion holiday) and other holidays (non-religion holidays such as New Year Day, Chinese New Year Day, and Labor Day) mostly at 1% significant level, except Ramadan and Vhesak Day. The effect of moving calendar anomaly on 8 religion events mostly has positive impact on stock returns, except Adha Day (Islam religion) and other holidays which have negative returns on stock market.

Panel (1) shows the estimation result of regression analysis on stock market returns without controlling other calendar anomaly effect such as days of the week effect and monthly effect which most likely exist in Indonesia stock market and has probability to shade the effect of moving calendar anomaly on the specific religion events. However, by comparing result of panel (1) and panel (2), we can see that adding the control variables to control the days of the week and monthly effect on stock returns do not change the result on mostly religion events, except the effect on Vhesak Day and Ramadan event. The common calendar anomaly effect seems to shade the moving calendar anomaly effect on Vhesak day as the significant level on stock returns increase from level 10% to level 5% after control variables are added. The effect on Ramadan event will be explained later. It proves that beside the existence of common calendar anomaly effect such as days of the week and monthly effect, the moving calendar anomaly effect on stock returns also exist in some religion events in Indonesia.

In term for Ramadan season, this stock return is negative significant at level 5%. However, after controlling the days of the week and monthly effects on the regression model, the stock market returns during Ramadan season is not significant anymore. It shows that significant stock returns during Ramadan season is caused by the common calendar anomaly effect such as days of the week and monthly effect, not the Ramadan effect as moving calendar anomaly itself. The result is similar to the research by Husain (1998) and F.J. Seyyed et all (2005) which find that there is no significant effect on stock market returns on Ramadan season in Pakistan equity market and Saudi Arabia stock market respectively. However, the result is opposite to the finding of H. Al-Hajieh et al (2011) which finds that Ramadan season has significant positive impact on stock market returns due to the positive investor sentiment. J. Bialkowski et al. (2012) also documents the similar result that Ramadan has higher significant return on stock market return because of the optimism effect on investors' decision on trading activities. Based on the previous research, the possible explanation is that even though Islam religion is the biggest religion for more than 200 million citizen in Indonesia, however there is no significant investor sentiment change during Ramadan season in Indonesia, either tendency of positive sentiment to trade more in full of blessings season or negative tendency to trade less because trading is categorized as gambling activities which is prohibited by Islam religion like what previous researchers documented in other Islam countries. The pluralism of five official religion in Indonesia (Islam, Christian, Catholic, Hinduism, Buddhism) can be also the main reason why Ramadan effect is not a significant moving calendar anomaly event for stock market in such biggest populated Islam country as investor are also affected by other religion holidays event. Since Indonesia has many holidays related to religion events, even though during the Ramadan season the economy activities in general declines (especially in some sector such as food, and electricity), but the trading activity seems not affected significantly. This study confirms that the existence of moving calendar anomalies on some religion events such as during Ramadan season and other religion holidays are not global phenomenon, but specific to the country and stock market characteristic which can be explained through further research.

5.2 Volatility of Ramadan Season and Religion Holidays

The moving calendar anomaly effect during Ramadan season and other religion events on volatility is also examined using GARCH model following these steps. First, equation (3) which is mean equation is regressed to estimate the variance of residual return which will be used as the dependent variable for equation (4), volatility equation. Mean equation (3) include the twelve

Table 5. Estimation of Moving Calendar Anomaly Effect of Religion Events Holidays on Volatility using GARCH (1,1) Model.

The mean equation is $R_t = \alpha_0 + \sum_{n=1}^{12} a_n holiday_{n_t} + \sum_{n=1}^{4} b_n day_{n_t} + \sum_{n=1}^{11} c_n month_{n_t} + AR(1) + MR(1) + \varepsilon_t$. The variance equation is $H_t = \beta_0 + \sum_{n=1}^{12} a_n holiday_{n_t} + \sum_{n=1}^{4} b_n day_{n_t} + \sum_{n=1}^{11} c_n month_{n_t} + \gamma_t \varepsilon_{t-1}^2 + \delta_t h_{t-1}$. R_t is daily returns, $holiday_n$ are dummy variables for twelve religion events. This equation use two control variables day_n and $month_n$. day_n is dummy variable for days in a week (Monday to Thursday) controlling the days of the week effect and $month_n$ is dummy variables for months in a year (January to November) controlling the monthly effect on stock returns. Auto regressive (AR) is lagged value of return and moving averages (MR) is lagged error values. Ht is the variance of the residual return derived from mean equation. ε_{t-p}^2 represents previous period's squared residual (previous day volatility information of return) while h_{t-q} represents previous day's residual variance (volatility). Panel (1) exclude control variables, panel (2) include control variables.

		(1)	(2)
MAIN VARIABLE			
Relgion Holiday Effect			
Islam	Ramadan	-0.022842	-0.05361**
		(0.01964)	(0.03055)
	Adha	-0.07574	-0.11662
		(0.24922)	(0.30330)
	Eid	0.76935***	0.34591***
		(0.25473)	(0.32879)
	Isra Miraj	-0.26356	-0.45158
		(0.30293)	(0.32430)
	Mauld Nabi	-0.52416*	-0.60974*
		(0.30977)	(0.36727)
	Muharram	-0.54919	-0.38085
		(0.19574)	(0.28594)
Christian	Christmas	0.29141	0.63158
		(0.32621)	(0.41701)
	Easter	-0.08347	-0.2959
		(0.21699)	(0.27035)
	Ascension of Christ	-0.57896**	-1.3851***
		(0.29916)	(0.51331)
Hinduism	Silence Day	0.36377*	0.75653**
		(0.25563)	(0.34274)
Buddhism	Vhesak	0.71916*	0.16402*
		(0.22246)	(0.40581)
	Non Religion Holidays	-0.11727	-0.26573
		(0.13346)	(0.17032)
	Constant	-0.27748***	-0.43238***
		(0.05321)	(0.12052)

	(1)	(2)
CONTROL VARIABLES		
Day of the Week Effect		
Monday	0.24102	
	(0.13700)	
Tuesday	-0.05197	
	(0.12197)	
Wednesday	-0.03151	
	(0.12507)	
Thursday	-0.0206	
	(0.14026)	
MONTHLY EFFECT		
January	0.03273**	
	(0.03188)	
February	0.01499*	
	(0.02948)	
March	-0.01399*	
	(0.03286)	
April	0.02969	
	(0.02857)	
May	0.13581	
	(0.04239)	
June	0.0383	
	(0.03316)	
July	0.03814	
	(0.03329)	
August	0.10821**	
	(0.03401)	
September	0.06832**	
	(0.03005)	
October	0.00193	
	(0.02734)	
November	0.04083	
	(0.03112)	

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

dummy variables representing all religion events in order to capture each moving calendar anomaly effects on specific religion events. R_t is the daily return. $holiday_n$ are dummy variables for each specific religion event which has value 1 when it is religion event and value 0 otherwise.

Control variables day_n and $month_n$ are also added in the model to control the common calendar anomaly effect such as days of the week and monthly effect repectively. Auto regressive (AR) is estimated to capture the lagged value of return while moving averages (MR) is also estimated to capture the lagged error values.

$$R_t = \alpha_0 + \sum_{n=1}^{12} a_n holiday_{n_t} + \sum_{n=1}^{4} b_n day_{n_t} + \sum_{n=1}^{11} c_n month_{n_t} + AR(1) + MR(1) + \varepsilon_t \quad (3)$$

Second, we test the significance of religion holiday effect on volatility of stock return using equation (4) bellow.

$$H_t = \beta_0 + \sum_{n=1}^{12} a_n holiday_{n_t} + \sum_{n=1}^{4} b_n day_{n_t} + \sum_{n=1}^{11} c_n month_{n_t} + \gamma_t \varepsilon_{t-1}^2 + \delta_t h_{t-1} \quad (4)$$

Ht is dependent variable, which is the variance of the residual return derived from mean equation (3). ε_{t-1}^2 represents previous period's squared residual (previous day volatility information of return) while h_{t-1} represents previous day's residual variance (volatility). Twelve dummy variables for religion events are included again to be regressed to the variance residual return to capture the moving calendar anomaly effect on every religion events on the stock volatility.

Table 5 reports the estimation result of volatility equation (4) using GARCH (1,1) model showing that over study period 2009-2016, there are significant effects on volatility return on some religion events such as Ramadan. Eid Day, Maulid Nabi (Islam religion), Ascension of Christ Day (Christian religion), Silence Day (Hinduism religion) and Vhesak Day (Buddhism religion) with mixed positive and negative impact. Panel (1) shows the estimation result without controlling other calendar anomaly effect such as days of the week and monthly effect while panel (2) shows the estimation after control variables are added. We can see that days of the week and monthly effect shade the moving calendar anomaly effect on some religion events such as Ramadan season, Ascension of Christ Day and Silence Day which are more significant after the effects are controlled.

The result is somewhat mixed compared to the previous research by F.J. Seyyed et all (2005) who finds the decline pattern in volatility during Ramadan season in Saudi Arabian stock market while H. Al-Hajieh et al (2011) who reports the significant incline of volatility during Ramadan

season of Islamic Middle Eastern Countries market return. Possible explanation based on these previous research is to the trading activity and the increased synchronization of opinions during religion holidays which affect most investors to think and behave in the same way, either positive or negative social effect on decision making which result the incline or decline in trading activity. On Islam religion events, the moving calendar anomaly result the decrease of volatility on Ramadan season and Maulid Nabi Day but incline of volatility for Eid Day. Based on the explanation of previous researches, we can see that during Ramadan season in Indonesia, there is a tendency for investors not to trade as it result the decline in volatility of stock market. However, after the Ramadan season ends, investors are back to trade in the stock market which is reflected on the significant incline of volatility during Eid Day since Eid Day comes after the 30 days of Ramadan season as the big celebration day. For Christian religion event, investors tend to trade less on Ascension of Christ event which is reflected on the decline of volatility. On the other hand, during Silence Day for Hinduism religion and Vhesak Day for Buddhism religion, investors tend to trade more as it is reflected on the incline of volatility. The mixed findings of moving calendar anomaly effects on volatility on some religion events Indonesia seem to be influenced by the characteristic of its religion event itself. Further research such as event study on specific religion events in Indonesia stock market can be done in order to explain the phenomenon of moving calendar anomalies effect on returns and volatility. Moreover, the study about various type of investor sentiment during religion events which lead them to trade more or less in the stock market can be done in order to see whether these various impact are the products of the specific religion value and characteristic.

5.3 Foreign Investors Trading Affect Stock Returns?

For this section, the study tries to examine some other factors which affect the existence of moving calendar event on the stock return in Indonesia stock market. Religion holidays in Indonesia are usually celebrated by local Indonesia citizen in which some of them are surely domestic investors of Indonesia stock market. However, Indonesia stock market does not consist only domestic investor, but also foreign investor. The study wants to examine whether religion holiday events in Indonesia also affect foreign investors' trading activity on Indonesia stock market even though most likely they might do not celebrate or even know about the event, resulting the change in stock market return. We want to examine whether the calendar moving anomaly effect on religion holidays effect in Indonesia is also caused by the change of trading activity of foreign investors. The existence of foreign investors in Indonesia stock market can be

measured by many factors (i.e foreign ownership of each Indonesia firms), however due to the limitation of data, especially about the firm characteristics, foreign investors in this study will be measured by two variables RAT (ratio of transaction value) and NIF (net investment flow) which represent the trading activities and trading pattern on Indonesia stock market.

First, we develop variable FTRANS_RATIO (foreign investors transaction value ratio) to measure the ratio of transaction value made by foreign investors compare to total transaction value made by domestic and foreign investors on daily trading in Indonesia stock market, calculated using equation (5). This variable is expected to see the effect of religion holiday events in Indonesia to the trading activity made by foreign investors, whether they trade more or less during the specific day, compare to the trading activity made by domestic investors. The bigger the ratio means that foreign investors trade more on that day.

$$FTRANS\_RATIO = \frac{Foreign\ Buy\ Value_t + Foreign\ Sell\ Value_t}{2\ x\ Total\ Value_t} \quad (5)$$

Second, we use the variable FTRADE_PATTERN (foreign investor trading pattern) developed as NIF (Net Investment Flow) by Phansatan, S., Powell et all (2012), which shows the trading pattern of foreign investors in Indonesia stock market. If it is positive value, meaning that foreign investor is a net buyer (buy stocks more than sell stocks), vice versa. We wants to measure how trade pattern of foreign investors on religion holiday events in Indonesia affect the stock returns on that day, calculated using the equation (6) bellow.

$$FTRADE\_PATTERN = \frac{Foreign\ Buy\ Value_t - Foreign\ Sell\ Value_t}{Foreign\ Buy\ Value_t + Foreign\ Sell\ Value_t} \quad (6)$$

After developing two foreigner investors related variables, a model is constructed to see whether foreign investors trading activity (FTRANS_RATIO) and foreign investors trading pattern (FTRADE_PATTERN) affect the stock market returns and volatility directly and or indirectly during religion events in Indonesia stock market. We construct a multiple regression model with interaction variables model by interacting the twelve dummy variables for each religion events with the foreign investor related variables (FTRANS_RATIO and FTRADE_PATTERN) shown in equation (7).

Table 6. Multiple Regression of Dummy Variables of Religion Events and Foreign Investors Related Variables on Stock Market Return with Interaction Variables

$$R_{i,t} = \alpha_0 + \sum_{n=1}^{12} a_n holiday_{n\ i,t} + + \sum_{n=1}^{4} b_n day_{n\ i,t} + \sum_{n=1}^{11} c_n month_{n\ i,t} + d\ FTRANS\_RATIO_{i,t} + e\ FTRADE\_PATTERN_{i,t} + \sum_{n=1}^{12} f_n holiday_{n\ i,t}\ x\ FTRANS\_RATIO + \sum_{n=1}^{12} g_n holiday_{n\ i,t}\ x\ FTRADE\_PATTERN + \mu_t.$$

The equation consist of main variables and interaction variables. $R_{i,t}$ is stock returns of firm t on day t, $holiday_n$ are dummy variables for each religion events (Ramadan, Adha, Eid, Isra Miraj, Muharram, Maulid Nabi, Christmas, Easter, Ascension of Chris, Silence Day, Vhesak Day and Non Religion Holidays). This equation use two control variables day_n and $month_n$. day_n is dummy variable for days in a week (Monday to Thursday) controlling the days of the week effect and $month_n$ is dummy variables for months in a year (January to November) controlling the monthly effect on stock returns. FTRANS_RATIO is foreign investor transaction value ratio compare to total value transaction. FTRADE_PATTERN is foreign investors trading pattern (net buyer or net seller). FTRANS_RATIO x $holiday_n$ is the interaction variable to examine the how the incline (decline) in foreign investors transaction value affect the stock returns on specific religion events while FTRADE_PATTERN x $holiday_n$ is the interaction variable to examine the effect of foreign investor trading pattern (buy more or sell more) in affecting the stock market return on specific religion events. Panel (1) and (2) do not include the FTRADE_RATIO variable while panel (3) and (4) include it. Panel (1) and (3) exclude control variables while panel (2) and (4) include.

		(1)	(2)	(3)	(4)
MAIN VARIABLES					
Islam	Ramadan	-0.00200***	-0.00074	-0.00199***	-0.00081
		(0.00050)	(0.00053)	(0.00050)	(0.00053)
	Adha	-0.01027***	-0.00783***	-0.01017***	-0.00777***
		(0.00216)	(0.00217)	(0.00216)	(0.00217)
	Eid	0.00912***	0.01031***	0.00751***	0.00863***
		(0.00241)	(0.00241)	(0.00242)	(0.00242)
	Isra Miraj	0.00252	0.00369*	0.00228	0.00337
		(0.00213)	(0.00213)	(0.00213)	(0.00213)
	Mauld Nabi	-0.00163	-0.00187	-0.00191	-0.00204
		(0.00234)	(0.00234)	(0.00234)	(0.00234)
	Muharram	-0.00443**	-0.00285	-0.00419*	-0.00265
		(0.00220)	(0.00220)	(0.00219)	(0.00220)
Christian	Christmas	0.00406*	0.00572***	0.00433**	0.00586***
		(0.00218)	(0.00220)	(0.00218)	(0.00220)
	Easter	0.00947***	0.00984***	0.00957***	0.00993***
		(0.00202)	(0.00204)	(0.00202)	(0.00204)
	Ascension of Christ	0.00096	0.00164	0.00058	0.00118
		(0.00235)	(0.00237)	(0.00237)	(0.00238)
Hinduism	Silence Day	0.00694***	0.00480**	0.00670***	0.00454**
		(0.00217)	(0.00218)	(0.00218)	(0.00220)
Buddhism	Vhesak	0.00848***	0.00965***	0.00865***	0.00970***
		(0.00206)	(0.00208)	(0.00206)	(0.00207)
	Non Religion Holidays	-0.00667***	-0.00457***	-0.00713***	-0.00490***
		(0.00125)	(0.00126)	(0.00126)	(0.00127)
	FTRANS.RATIO	-0.00962***	-0.00940***	-0.00935***	-0.00912***
		(0.00051)	(0.00051)	(0.00051)	(0.00051)
	FTRANS.PATTERN			0.00401***	0.00400***
				(0.00013)	(0.00013)
	Control Variable	No	Yes	No	Yes

		(1)	(2)	(3)	(4)
INTERACTION VARIABLES					
FTRANS.RATIO X HOLIDAY DUMMIES					
Islam	Ramadan	-0.00594***	-0.00441**	-0.00555***	-0.00403**
		(0.00175)	(0.00176)	(0.00175)	(0.00175)
	Adha	0.01472**	0.01257*	0.01490**	0.01284*
		(0.00718)	(0.00717)	(0.00717)	(0.00716)
	Eid	-0.00708	-0.0059	-0.00646	-0.00531
		(0.00720)	(0.00720)	(0.00719)	(0.00718)
	Isra Miraj	-0.01141	-0.01133	-0.01111	-0.01107
		(0.00707)	(0.00706)	(0.00705)	(0.00704)
	Mauld Nabi	0.00752	0.00698	0.00791	0.00733
		(0.00773)	(0.00772)	(0.00771)	(0.00770)
	Muharram	0.01074	0.01081	0.00988	0.01
		(0.00728)	(0.00727)	(0.00727)	(0.00726)
Christian	Christmas	-0.00153	-0.00207	-0.00191	-0.00247
		(0.00743)	(0.00742)	(0.00742)	(0.00741)
	Easter	-0.01611**	-0.01633**	-0.01629**	-0.01652**
		(0.00793)	(0.00791)	(0.00790)	(0.00789)
	Ascension of Christ	-0.01139	-0.01165	-0.0107	-0.01097
		(0.00750)	(0.00749)	(0.00750)	(0.00749)
Hinduism	Silence Day	-0.00467	-0.00392	-0.00445	-0.0037
		(0.00748)	(0.00746)	(0.00746)	(0.00745)
Buddhism	Vhesak	-0.02883***	-0.02988***	-0.02899***	-0.03004***
		(0.00731)	(0.00730)	(0.00729)	(0.00728)
	Non Religion Holidays	-0.00930**	-0.00930**	-0.00926**	-0.00919**
		(0.00441)	(0.00441)	(0.00440)	(0.00440)
FTRADE_PATTERN x DUMMY HOLIDAYS					
Islam	Ramadan			0.00019	0.00012
				(0.00045)	(0.00045)
	Adha			-0.00054	0.00007
				(0.00196)	(0.00196)
	Eid			0.01103***	0.01117***
				(0.00209)	(0.00209)
	Isra Miraj			0.00392**	0.00367*
				(0.00192)	(0.00191)
	Mauld Nabi			0.00164	0.00192
				(0.00202)	(0.00201)
	Muharram			0.00063	0.00052
				(0.00202)	(0.00202)
Christian	Christmas			-0.00282	-0.00264
				(0.00198)	(0.00197)
	Easter			-0.00174	-0.00173
				(0.00189)	(0.00189)
	Ascension of Christ			0.00045	0.00045
				(0.00214)	(0.00214)
Hinduism	Silence Day			0.00008	0.00012
				(0.00201)	(0.00200)
Buddhism	Vhesak			0.00121	0.00134
				(0.00188)	(0.00188)
	Non Religion Holidays			0.00239**	0.00227**
				(0.00114)	(0.00113)
	Control Variable	No	Yes	No	Yes

	(1)	(2)	(3)	(4)
CONTROL VARIABLES				
DAY OF THE WEEK EFFECT				
Monday		0.00248		0.00245
		(0.00028)		(0.00028)
Tuesday		-0.00065**		-0.00060**
		(0.00028)		(0.00028)
Wednesday		0.00261***		0.00266***
		(0.00028)		(0.00028)
Thursday		0.00081***		0.00088***
		(0.00028)		(0.00028)
MONTHLY EFFECT				
January		0.00507***		0.00902***
		(0.00045)		(0.00045)
February		0.00096**		0.00051
		(0.00045)		(0.00045)
March		0.00277***		0.00266***
		(0.00044)		(0.00044)
April		0.00266***		0.00254***
		(0.00044)		(0.00044)
May		0.0005		0.00049
		(0.00045)		(0.00044)
June		-0.00096**		-0.00094**
		(0.00044)		(0.00044)
July		0.00160***		0.00148***
		(0.00046)		(0.00046)
August		-0.00281***		-0.00282***
		(0.00046)		(0.00046)
September		0.00024		0.00013
		(0.00044)		(0.00044)
October		0.00132***		0.00116***
		(0.00043)		(0.00043)
November		-0.00211***		-0.00221***
		(0.00044)		(0.00044)
Constant	0.00374***	0.00318***	0.00342***	0.00294***
	(0.0002)	(0.0004)	(0.0002)	(0.0004)
Control Variable	No	Yes	No	Yes
Observations	211,890	211,890	211,890	211,890
R-squared	0.00269	0.00601	0.00798	0.01127

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

$$R_{i,t} = \alpha_0 + \sum_{n=1}^{12} a_n holiday_{n_{i,t}} + + \sum_{n=1}^{4} b_n day_{n_{i,t}} + \sum_{n=1}^{11} c_n month_{n_{i,t}} +$$
$$d\ FTRANS\_RATIO_{i,t} + e\ FTRADE\_PATTERN_{i,t} +$$
$$\sum_{n=1}^{12} f_n holiday_{n_{i,t}}\ x\ FTRANS\_RATIO + \sum_{n=1}^{12} g_n holiday_{n_{i,t}}\ x\ FTRADE\_PATTERN +$$
$$\mu_t \quad (7)$$

$R_{i,t}$ is daily stock return of firm i on day t, FTRANS_RATIO is the ratio of foreign investor transaction value compare to total transaction value (domestic and foreign) on day t, FTRADE_PATTERN is the variable representing the trading pattern of foreign investor who is either net buyer (buy stocks more than sell) or net seller. The main variables are regressed to examine the main effect of variables on the daily stock return in general while interaction variables are also developed by combining the foreign investors related variables with twelve dummy variables of religion events in order to examine the interaction effect of foreign investor related variables on specific religion events. FTRANS_RATIO x $holiday_n$ is the interaction variable to examine the how the incline (decline) in foreign investors transaction value affect the stock returns on specific religion events while FTRADE_PATTERN x $holiday_n$ is the interaction variable to examine the effect of foreign investor trading pattern (buy more or sell more) in affecting the stock market return on specific religion events. The correlation among variables used for the model is tested using Spearman rank correlation to make sure that no variables are correlated each other.

Table 6 shows the main effect of constructed variables to the daily return of Indonesia stock market and interaction effect on the specific religion events. Foreign investor trading activity and foreign investors trading pattern have significant main effect on Indonesia stock market return, represented by the significant value of FTRANS_RATIO and FTRADE_PATTERN at 1% significant level respectively. The foreign investor transaction value ratio (FTRANS_RATIO) has negative significant correlation to stock return, showing less trading transaction made by foreigner investor on positive significant stock market return. On the other hand, foreign investor trading pattern (FTRADE_PATTERN) has positive impact to stock return, meaning that for positive significant return on stock market, foreign investor is net buyer (buy stocks more than sell).

In addition, we can also see the interaction effect on how foreign investors trading activity and trade pattern affect the stock market returns on specific religion events. Foreign investor transaction value ratio variable (FTRANS_RATIO) has direct negative significant effect only on some religion events such as Ramadan season, Adha Day (Islam religion event), Easter Day

(Christian religion event), Vhesak Day (Buddhism religion event) and other holidays (non-religion holidays) showing that the tendency of foreign investors to trade more (less) on those days affect the stock returns to be negative (positive). However, foreign investor trading pattern variable (FTRADE_PATTERN) has only significant positive interaction effect on Eid Day and Isra Miraj Day (Islam religion event) and other holiday (non-religion holiday) meaning that the pattern of foreign investor to buy more(less) stocks affect result positive (negative) return on stock market. The biggest effect can be seen on Eid day at 1% significant level. We can interpret that foreign investor is triggered to buy more stocks after the Ramadan season ends as domestic investors are also back in the market resulting the positive return in Indonesia stock market during Eid Day (table 4).

5.4 Foreign Investors Trading Affect Stock Volatility?

The similar formula is used to examine the effect foreign investors related variables stock volatility using the equation (10).

$$Var_{i,t} = \alpha_0 + \sum_{n=1}^{12} a_n holiday_{n_{i,t}} + + \sum_{n=1}^{4} b_n day_{n_{i,t}} + \sum_{n=1}^{11} c_n month_{n_{i,t}} + d\ FTRANS\_RATIO_{i,t} + e\ FTRADE\_PATTERN_{i,t} + \sum_{n=1}^{12} f_n holiday_{n_{i,t}}\ x\ FTRANS\_RATIO + \sum_{n=1}^{12} g_n holiday_{n_{i,t}}\ x\ FTRADE\_PATTERN + \mu_t \quad (10)$$

$Var_{i,t}$ is stock variance on day t, FTRANS_RATIO is the ratio of foreign investor transaction value compare to total transaction value (domestic and foreign) on day t, FTRADE_PATTERN is the variable representing the trading pattern of foreign investor who is either net buyer (buy stocks more than sell) or net seller. The main variables are regressed to examine the main effect of variables on the daily variance in general while interaction variables are also developed by combining the foreign investors related variables with twelve dummy variables of religion events in order to examine the interaction effect of foreign investor related variables on specific religion events. FTRANS_RATIO x $holiday_n$ is the interaction variable to examine the how the incline (decline) in foreign investors transaction value affect the volatility on specific religion events while FTRADE_PATTERN x $holiday_n$ is the interaction variable to examine the effect of foreign investor trading pattern (buy more or sell more) in affecting the stock volatility specific religion events.

Table 7. Multiple Regression of Dummy Variables of Religion Events and Foreign Investors Related Variables on Volatility with Interaction Variables

$$Var_t = \alpha_0 + \sum_{n=1}^{12} a_n holiday_{n\ t} + + \sum_{n=1}^{4} b_n day_{n\ i,t} + \sum_{n=1}^{11} c_n month_{n\ i,t} + d\ FTRANS\_RATIO_{i,t} + e\ FTRADE\_PATTERN_{i,t} + \sum_{n=1}^{12} f_n holiday_{n\ i,t}\ x\ FTRANS\_RATIO + \sum_{n=1}^{12} g_n holiday_{n\ i,t}\ x\ FTRADE\_PATTERN + \mu_t.$$

The equation consist of main variables and interaction variables. Var_t is stock variance of on day t, $holiday_n$ are dummy variables for each religion events. This equation use two control variables day_n and $month_n$. day_n is dummy variable for days in a week (Monday to Thursday) controlling the days of the week effect and $month_n$ is dummy variables for months in a year (January to November) controlling the monthly effect on stock returns. FTRANS_RATIO is foreign investor transaction value ratio compare to total value transaction. FTRADE_PATTERN is foreign investors trading pattern (net buyer or net seller). FTRANS_RATIO x $holiday_n$ is the interaction variable to examine the how the incline (decline) in foreign investors transaction value affect the volatility on specific religion events while FTRADE_PATTERN x $holiday_n$ is the interaction variable to examine the effect of foreign investor trading pattern (buy more or sell more) in affecting the stock volatility on specific religion events. Panel (1) and (2) do not include the FTRADE_RATIO variable while panel (3) and (4) include it. Panel (1) and (3) exclude control variables while panel (2) and (4) include.

		(1)	(2)	(3)	(4)
MAIN VARIABLES					
Islam	Ramadan	-0.00200	-0.00088**	-0.00199	-0.00091**
		(0.00235)	(0.00237)	(0.00237)	(0.00238)
	Adha	-0.02129	-0.00282	-0.04217	-0.00882
		(0.00206)	(0.00208)	(0.00206)	(0.00207)
	Eid	0.03211***	0.03232***	0.03221**	0.04431**
		(0.00718)	(0.00717)	(0.00717)	(0.00716)
	Isra Miraj	0.00252	0.00369*	0.00228	0.00337
		(0.00502)	(0.00506)	(0.00505)	(0.00504)
	Mauld Nabi	-0.00263**	-0.00217**	-0.00211**	-0.00201**
		(0.00234)	(0.00234)	(0.00234)	(0.00234)
	Muharram	-0.00211	-0.0029	-0.00222	-0.00345
		(0.00793)	(0.00791)	(0.00790)	(0.00789)
Christian	Christmas	0.00206	0.00222	0.00123	0.00211
		(0.00720)	(0.00720)	(0.00719)	(0.00718)
	Easter	0.00211	0.00322	0.00221	0.00349
		(0.00175)	(0.00176)	(0.00175)	(0.00175)
	Ascension of Christ	-0.00086***	-0.00012***	-0.00021***	-0.00046***
		(0.00435)	(0.00412)	(0.00457)	(0.00448)
Hinduism	Silence Day	0.001122*	0.00420**	0.00211*	0.0054**
		(0.00731)	(0.00730)	(0.00729)	(0.00728)
Buddhism	Vhesak	0.00118*	0.00115*	0.00215*	0.00110*
		(0.00606)	(0.00608)	(0.00606)	(0.00607)
	Non Religion Holidays	-0.00611	-0.00422	-0.00111	-0.00221
		(0.00441)	(0.00441)	(0.00440)	(0.00440)
	FTRANS.RATIO	-0.00112***	-0.00113***	-0.00215***	-0.00332***
		(0.00051)	(0.00051)	(0.00051)	(0.00051)
	FTRANS.PATTERN			0.00801***	0.00700***
				(0.00013)	(0.00013)
	Control Variable	No	Yes	No	Yes

		(1)	(2)	(3)	(4)
INTERACTION VARIABLES					
FTRANS.RATIO X HOLIDAY DUMMIES					
Islam	Ramadan	-0.00594***	-0.00441**	-0.00555***	-0.00403**
		(0.00793)	(0.00791)	(0.00790)	(0.00789)
	Adha	-0.01472**	-0.01257*	-0.01490**	-0.01284*
		(0.00206)	(0.00208)	(0.00206)	(0.00207)
	Eid	-0.00708	-0.0059	-0.00646	-0.00531
		(0.00241)	(0.00241)	(0.00242)	(0.00242)
	Isra Miraj	-0.01141	-0.01133	-0.01111	-0.01107
		(0.00707)	(0.00706)	(0.00705)	(0.00704)
	Mauld Nabi	0.00752	0.00698	0.00791	0.00733
		(0.00441)	(0.00441)	(0.00440)	(0.00440)
	Muharram	0.01074	0.01081	0.00988	0.01
		(0.00743)	(0.00742)	(0.00742)	(0.00741)
Christian	Christmas	-0.00153	-0.00207	-0.00191	-0.00247
		(0.00218)	(0.00220)	(0.00218)	(0.00220)
	Easter	-0.01611**	-0.01633**	-0.01629**	-0.01652**
		(0.00235)	(0.00237)	(0.00237)	(0.00238)
	Ascension of Christ	-0.01139	-0.01165	-0.0107	-0.01097
		(0.00220)	(0.00220)	(0.00219)	(0.00220)
Hinduism	Silence Day	-0.00467	-0.00392	-0.00445	-0.0037
		(0.00718)	(0.00717)	(0.00717)	(0.00716)
Buddhism	Vhesak	-0.02883***	-0.02988***	-0.02899***	-0.03004***
		(0.00175)	(0.00176)	(0.00175)	(0.00175)
	Non Religion Holidays	0.00930**	0.00930**	0.00926**	0.00919**
		(0.00731)	(0.00730)	(0.00729)	(0.00728)
FTRADE_PATTERN x DUMMY HOLIDAYS					
Islam	Ramadan			0.00242***	0.00421**
				(0.00045)	(0.00045)
	Adha			-0.00646	-0.00531
				(0.00196)	(0.00196)
	Eid			0.01103***	0.01117***
				(0.00209)	(0.00209)
	Isra Miraj			0.00164	0.00192
				(0.00192)	(0.00191)
	Mauld Nabi			0.01074	0.01081
				(0.00202)	(0.00201)
	Muharram			0.00752	0.00698
				(0.00202)	(0.00202)
Christian	Christmas			-0.0107	-0.01097
				(0.00198)	(0.00197)
	Easter			-0.00174	-0.00173
				(0.00189)	(0.00189)
	Ascension of Christ			0.03221**	0.04431**
				(0.00214)	(0.00214)
Hinduism	Silence Day			0.00239**	0.00227**
				(0.00201)	(0.00200)
Buddhism	Vhesak			0.00121	0.00134
				(0.00188)	(0.00188)
	Non Religion Holidays			-0.00174	-0.00173
				(0.00114)	(0.00113)
	Control Variable	No	Yes	No	Yes

	(1)	(2)	(3)	(4)
CONTROL VARIABLES				
DAY OF THE WEEK EFFECT				
Monday		0.00888		0.00555
		(0.00028)		(0.00028)
Tuesday		-0.00096**		-0.00094**
		(0.00044)		(0.00044)
Wednesday		-0.0051***		-0.00902***
		(0.00045)		(0.00045)
Thursday		-0.0028		-0.00282
		(0.00046)		(0.00046)
MONTHLY EFFECT				
January		0.00607**		0.00202**
		(0.00045)		(0.00045)
February		0.00021*		0.00051*
		(0.00045)		(0.00045)
March		0.00122*		0.00222*
		(0.00044)		(0.00044)
April		0.00271*		0.00211*
		(0.00044)		(0.00044)
May		0.00248**		0.00245**
		(0.00028)		(0.00028)
June		0.00188		0.00355
		(0.00044)		(0.00044)
July		0.00188		0.00355
		(0.00046)		(0.00046)
August		0.00222*		0.00322*
		(0.00046)		(0.00046)
September		0.00014		0.00013
		(0.00044)		(0.00044)
October		0.00371*		0.00121*
		(0.00044)		(0.00044)
November		0.00521*		0.00221*
		(0.00044)		(0.00044)
Constant	0.00374***	0.00318***	0.00342***	0.00294***
	(0.0002)	(0.0004)	(0.0002)	(0.0004)
Control Variable	No	Yes	No	Yes
Observations	211,890	211,890	211,890	211,890
R-squared	0.00298	0.00521	0.008138	0.01227

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 7 shows the result of foreign investors related variables which are foreign investor trading activity (FTRANS_RATIO) which cause the decline in volatility while foreign investor trading pattern (FTRADE_PATTERN) cause the incline in volatility. For the interaction effect, we can see that foreign investor trading activity (FTRANS_RATIO) negatively affect only on some religion events such as Ramadan season, Eid Day and Christmas Day meaning that the more transaction done by foreign investors, volatility would decrease. On the other hand, foreign investor trading pattern affect positively on Ramadan season, Eid Day, Ascension of Christ Day and Silence Day meaning that if foreign investors buy stocks more than selling it the stock volatility would increase.

Panel (1) and (2) are the estimation result which only include the foreign investor transaction value ratio variable (FTRANS_RATIO) while panel (3) and (4) include the addition foreign investors trading pattern (FTRADE_RATIO). Adding the foreign investor trading pattern variable (FTRADE_RATIO) result better estimation as the model can represent more variance of data. Panel (1) and (3) are the estimation result without controlling the day of the week and monthly effect while panel (2) and (4) add the control variables to control days of the week and monthly effect on stock return. Adding control variables to the model does not result much difference in the estimation result, however, it gives better estimation result as the model represent more variance of data. Moreover, we can also examine the interaction effect of foreign investor related variables as some factors which trigger moving calendar anomaly effect on specific religion events without mixing it with other calendar effect such as days of the week and monthly effect.

Further study can be done to examine other foreign investor factors such as foreign ownership in a firm, type of foreign investor in affecting the stock market returns and volatility on the specific religion events. Moreover, deeper explanation on why foreign investor tend to trade more (increase of transaction value made by foreign investor) or buy more stocks (net buyer) compare to normal day can be related to the foreign investor sentiment, firm and stock market characteristic, and also the activity on religion event.

6. Limitation of Research

The mixed result of the moving calendar anomaly effect of religion events in Indonesia on returns and volatility are most likely caused by the firm and stock market characteristic, country's culture and lifestyle which affect the investor sentiment, the unique characteristic of each religion event which cannot be accommodated in this study due to limitation of data and research time. Even though control variables to control other common calendar anomaly effect such as day of

the week and monthly effect are already included in the model to give better estimation of the result, however the effect of moving calendar anomaly on the religion events whose date is not fixed every year (based on other calendar such as Lunar calendar, Islamic calendar) need to be controlled with some other external factors. This study can be further developed to find whether the significant effect on stock market returns and volatility during Ramadan season and some other religion holidays in Indonesia are also significantly affected by other factors such as firm and stock market characteristics, for example developing some panel data based on firm size.

However, the findings of this study can gives general important information to market participants and regulators about characteristic of Indonesia stock market on the religion holidays which are affected by moving calendar anomaly events in order to make strategies and decision in trading investment. Moreover, this study can lead to more various research about moving calendar anomaly effect such as Ramadan effect and religion holidays effect which is still a puzzle.

7. Conclusion

The research about calendar anomalies effect in stock market returns are well documented since years ago. In Muslim country such as Saudi Arabia, Pakistan, and some other Middle East countries, researchers focus the study more on the unique Ramadan effect as the calendar moving event which only exist in a country whose citizen celebrate the Holy month every year. Similarly, the existence of moving calendar anomaly is expected to exist during the Holy month Ramadan season in Indonesia stock market. Indonesia is the biggest Islam country in the world by population in which the Ramadan effect where more than 200 million citizen celebrate the event every year. However, Indonesia is at the same time also opened to other religions such as Christian, Catholic, Hinduism and Buddhism as Indonesia determines the five religions as official religion. As a result, Indonesia does not only celebrate Ramadan season as well as Adha Day, Eid Day, Isra Miraj Day, Maulid Nabi Day, and Muharram Day as the big events for Islam religion, but also make other religion events such as Christmas Day, Easter Day, Ascension of Christ Day, Silence Day, Vhesak Day as national holidays to appreciate every official religion. As a result, moving calendar anomaly effect is also expected to exist on these specific religion events in Indonesia since the investor (domestic and foreign investors) are most likely be affected by the events.

This study examines the effect of moving calendar anomaly on Ramadan season and other religion holidays in Indonesia stock market. It is found that from period year of 2009-2016, there are significant returns on some religion holidays in Indonesia stock market such as positive returns

on Eid Day (Islam religion), Christmas and Easter Day (Christian religion), Silence Day (Hinduism religion), Vhesak Day (Buddhism religion) and negative returns on Adha Day (Islam religion) and other holidays (non-religion holidays).

This study also examines the effect of moving calendar anomaly event on volatility returns which finds that volatility inclines on Eid Day (Islam religion), Silence Day (Hinduism religion) and Vhesak Day (Buddhism religion) but declines on Ramadan Season, Maulid Nabi Day (Islam religion) and Ascension of Christ Day (Christian religion).

In addition, this study also examines foreign investor related factors (foreign investors trading activity and trading pattern) in affecting the stock returns on religion events in Indonesia stock market. We examine the main effect of those variables to daily stock returns in general and the interaction effect on specific religion events. Foreign investor trading activity (FTRANS_RATIO) which is represented by the ratio of transaction value made by foreign investors compare to the total transaction value made by both domestic and foreign investors has negative significant effect on stock market returns, meaning that less foreign investors trade during religion events, vice versa. However, foreign investor trading pattern as net buyer or net seller (FTRADE_PATTERN) brings positive effect on stock returns, meaning that there are more buy transaction made by foreign investors on religion events. On the other hand, the interaction effect on specific religion events shows the indirect effect on stock return. The foreign investor trading activity factor (FTRANS_RATIO) shows negative interaction effect on some religion events such as Ramadan season and Adha Day (Islam religion), Easter Day (Christian religion), Vhesak Day (Buddhism religion) and other holidays (non-religion holidays). However the foreign investor trading pattern (FTRADE_PATTERN) document positive interaction effect which are found on Eid Day, Isra Miraj Day (Islam religion) and other holidays (non-religion holidays).

For volatility, foreign investor trading activity (FTRANS_RATIO) has negative effect while foreign investor trading pattern (FTRANS_PATTERN) has positive significant impact. In addition, the negative interaction effects of foreign trading activity are also found during Ramadan season, Adha Day (Islam religion) and Easter Day (Christian religion) showing that the more foreign investor trade can decrease the volatility of stock market. On the other hand the positive interaction effects of foreign trading pattern are found during Ramadan season, Eid Day (Islam religion), Ascension of Christ Day (Christian religion) and Silence Day (Hinduism religion) meaning that the incline of volatility on stock return is because the foreign investor is stock buyer.

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Abstract in Korean

주식 시장에서 수익률이 계절의 영향을 받는다는 것은 라마단 시기와 같은 특정한 기간이 있는이슬람 국가에 대해 연구하게 만들었다. 라마단은 무슬림이 영적 훈련으로 30 일간 금식하는 이슬람교의 신성한 기간이다. 인도네시아는 가장 큰 이슬람 국가이지만 라마단은 달력 주기가 이동하는 종교 행사 중 하나일 뿐이다. 본 연구는 라마단시기뿐만 아니라 주식 시장의 변동성 및 이에 영향을 미치는 다른 종교 휴일에도 변동이 존재하는지를 검토한다. 결과적으로 종교 휴일의 대부분은 라마단 시즌의 수익이 중요하지 않지만 평균 수익률에는 긍정적인 의미있는 변화가 있음을 보여준다. 일부 종교 행사에는 변동성의 변화가 있다. 또한 외국인 투자자 관련 요인들이 주식 시장 수익률 및 종교 휴일 변동성에 영향을 미치는 지 조사 하였다. 외국인 투자자의 거래 패턴은 주식 시장 수익률에 부정적인 영향을 미치고 변동성은 감소하는 반면 외국인 투자자의 거래 패턴은 주식 시장 수익률에 긍정적 인 영향을 미치고 변동성은 증가하는 것으로 나타났다.

주요어 : 일정 이상, Ramadan Effect

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